

## PATENT ABSTRACTS OF JAPAN

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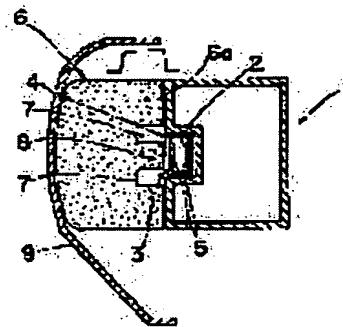
(22)Date of filing : 04.02.1999 (72)Inventor : MORI TATSURO

## (54) BUMPER FOR VEHICLE

## (57)Abstract:

PROBLEM TO BE SOLVED: To ensure a stable shock detection performance by forming a groove extending in the longitudinal direction at a front face of a reinforcement member, and mounting a collision detection sensor in the groove.

SOLUTION: A groove 2 is formed in the longitudinal direction at a front face of a reinforcement member 1. In the groove 2 a collision detection sensor 3 is mounted so that its front face may be substantially flush with that of the member 1. The sensor 3 has a pair of opposed electrodes 5, 5 at its inner surface. The member 1 is formed by extruding an aluminium alloy. At a rear face 6a of a shock absorbing material 6, a pair of upper and lower grooves 7, 7 are formed to construct a push-in part with respect to the sensor 3. Ahead of the material 6 a bumper facia 9 is arranged. When the material 6 is pressed and crushed by the collision with a substance, the sensor 3 is put on.



## LEGAL STATUS

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The bumper for cars characterized by containing the above-mentioned collision detection sensor into this slot while forming in the front face of the above-mentioned reinforcement the slot which extends in a longitudinal direction in the bumper for cars which comes to arrange a collision detection sensor between an impact absorber and a reinforcement.

[Claim 2] The bumper for cars according to claim 1 characterized by making the front face of the above-mentioned collision detection sensor into the front face and abbreviation flush of a reinforcement.

[Claim 3] The bumper for cars according to claim 1 or 2 characterized by having formed the slot of a vertical pair in the rear face of the above-mentioned impact absorber, and constituting the pushing section to the above-mentioned collision detection sensor.

[Claim 4] The bumper for cars according to claim 1 to 3 characterized by forming the above-mentioned reinforcement by extrusion molding.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the bumper for cars.

[0002]

[Description of the Prior Art] There are some which gave the impact buffer function to the front hood of an automobile. For example, if the collision detection sensor installed in the front bumper detects an impact, the equipment which has bounded the back end of a front hood is indicated by JP,4-81369,A. In this official report, the aspect with which the collision detection sensor was attached in the clearance between the shock absorbing material and the bumper facias of the front face of a bumper beam is indicated.

[0003]

[Problem(s) to be Solved by the Invention] In order to make it make it generate from the early stages of a collision, as the impact absorptivity by the impact absorber is shown in drawing 3 as installation structure of a collision detection sensor, Slot c is formed in a mating face with the reinforcement b of the impact absorber a, and there are some which contained the collision detection sensor d into this slot c. In addition, what carried out opposite arrangement of the electrodes f and f of a pair is used for the inside of Tube e at the collision detection sensor d.

[0004] However, with such structure, if a bumper facia g deforms in response to the load of the vertical direction, in order that the same deformation as the impact absorber a may reach, as the collision detection sensor d shows drawing 5, it is crushed and there is a possibility of incorrect-operating. For this reason, the thing for which the detection conditions of an impact are set up correctly -- it will be necessary to make sensibility of the collision detection sensor d low etc. -- may become difficult.

[0005] Furthermore, since the impact absorber a is formed of foaming, the depth of Slot c tends to produce dispersion. for this reason, the path clearance delta with the collision detection sensor d is not stabilized, but if it is hard to keep impact detection sensibility constant, it will obtain, and there is also a fault.

[0006] This invention aims at offering the bumper for cars with which the stable impact detection engine performance is obtained in view of such a situation.

[0007]

[Means for Solving the Problem] In the bumper for cars which comes to arrange a collision detection sensor between an impact absorber and a reinforcement, this invention for solving the above-mentioned technical problem is characterized by containing the above-mentioned collision detection sensor into this slot while it forms in the front face of the above-mentioned reinforcement the slot which extends in a longitudinal direction.

[0008] The front face of the above-mentioned collision detection sensor may be made into the front face and abbreviation flush of a reinforcement.

[0009] The slot of a vertical pair may be formed in the rear face of the above-mentioned impact absorber, and the pushing section to the above-mentioned collision detection sensor may be constituted.

[0010] The above-mentioned reinforcement may be formed by extrusion molding.

[0011]

[Embodiment of the Invention] Hereafter, the example of this invention is explained to a detail, referring to an accompanying drawing.

[0012] Drawing 1 disassembles and shows the bumper for cars of this invention. In this drawing, 1 is a reinforcement and has formed the slot 2 in front 1a at the longitudinal direction. In this slot 2, in the front 3a, as the collision detection sensor 3 becomes front 1a of a reinforcement 1, and abbreviation flush, it is contained. This collision detection sensor 3 has carried out opposite arrangement of the electrodes 5 and 5 of a pair at the inside of a tube 4. In addition, the reinforcement 1 is fabricated by extrusion molding of an aluminum alloy.

[0013] 6 is an impact absorber, forms the slots 7 and 7 of a vertical pair in rear-face 6a, and constitutes the pushing section 8 to the collision detection sensor 3. 9 is a bumper facia arranged ahead of an impact absorption 6. And if the impact absorber 6 is crushed by the collision with a body, the pushing section 8 carries out press deformation of the collision detection sensor 3, ON actuation is carried out, a front hood lift rise device (not shown) operates, and it has come to bound the back end of a front hood.

[0014] According to the structure of this example, since the collision detection sensor 3 is contained by the slot 2 of a reinforcement 1, even if the impact absorber 6 moves up and down, a possibility that the collision detection sensor 3 may incorrect-operate is lost. For this reason, it becomes unnecessary to make sensibility of the collision detection sensor 3 low, and a setup of the detection conditions of an impact becomes easy.

[0015] moreover, the front face of the collision detection sensor 3 -- front 1a of a reinforcement 1, and abbreviation -- since it is made flat-tapped and it becomes unnecessary to fabricate an opposed face (namely, pushing in by this example section 8) with the collision detection sensor 3 of the impact absorber 6 to a groove, it pushes in with the collision detection sensor 3, and it is easy to keep path clearance with the section 8 constant, and the stable impact detection engine performance can be obtained.

[0016] Furthermore, since the slots 7 and 7 of a vertical pair are formed and stuffed into rear-face 6a of the impact absorber 6 and the section 8 is constituted, transfer of the impact load over the collision detection sensor 3 is ensured, and actuation of the collision detection sensor 3 is stabilized.

[0017] By the way, although it will be necessary to form the slot 2 of a reinforcement 1 quite broadly compared with it of the collision detection sensor 3 in order to push in the collision detection sensor 3 certainly by the impact absorber 6 when it pushes into the impact absorber 6 and the section 8 is not formed If the pushing section 8 like this example is formed in the impact absorber 6, it will become unnecessary to make width of face of a slot 2 large, and the attachment precision of the collision detection sensor 3 will improve.

[0018] Since the reinforcement 1 is fabricated by extrusion molding, it can form a slot 2 with a sufficient precision, and shakiness of the collision detection sensor 3 stops producing it further again.

[0019] In addition, although the example which it bounds [ example ] by detection of the collision detection sensor 3, and operates a raising-type hood was given with the gestalt of this example, if it operates by carrying out collision detection by the collision detection sensor 3, it is applicable also to others (hood air bag etc.) other than the hood of various gestalten, or a splashes raising hood, and a device.

[0020]

[Effect of the Invention] According to this invention, since a collision detection sensor is contained by the slot on the reinforcement, even if an impact absorber moves up and down, a possibility that a collision detection sensor may incorrect-operate is lost. For this reason, it becomes unnecessary to make sensibility of a collision detection sensor low, and the detection conditions of an impact can be set up easily.

[0021] If it is made a configuration like claim 2, since the front face of the collision detection sensor 3 will become front 1a of a reinforcement 1, and abbreviation flush, it is easy to keep constant the path clearance of a collision detection sensor and an impact absorber, and the stable impact detection engine performance can be obtained.

[0022] If it is made a configuration like claim 3, while transfer of the impact load over a collision detection sensor will be ensured and actuation of a collision detection sensor will be stabilized, it becomes unnecessary to make the slot on the reinforcement broad, and the attachment precision of a collision detection sensor improves.

[0023] When it is made a configuration like claim 4, the shaping precision of the slot to a reinforcement becomes good, and shakiness of a collision detection sensor stops arising.

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## DESCRIPTION OF DRAWINGS

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**[Brief Description of the Drawings]**

[Drawing 1] The \*\*\*\*\* Fig. showing the bumper for cars of this invention.

[Drawing 2] Drawing of longitudinal section of this bumper.

[Drawing 3] Drawing showing drawing 2 and the corresponding conventional example.

[Drawing 4] The enlarged drawing in the dotted-line frame A of drawing 3.

[Drawing 5] Drawing explaining the trouble of the conventional example.

**[Description of Notations]**

1 -- Reinforcement

2 -- Slot

3 -- Collision detection sensor

6 -- Impact absorber

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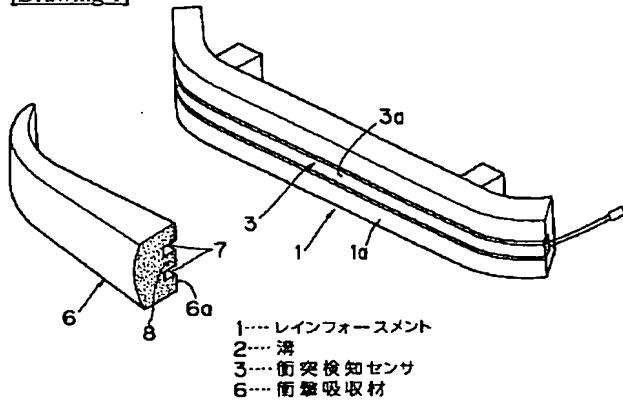
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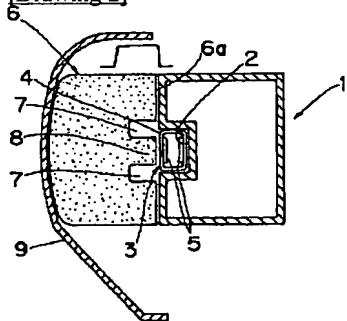
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## DRAWINGS

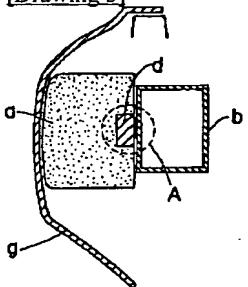
## [Drawing 1]



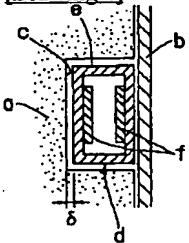
## [Drawing 2]



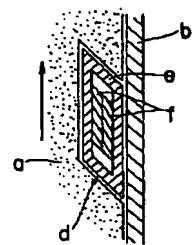
## [Drawing 3]



## [Drawing 4]



## [Drawing 5]



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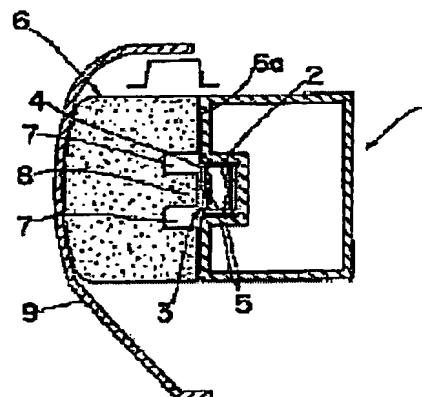
# BUMPER FOR VEHICLE

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**Inventor:** MORI TATSURO  
**Applicant:** NISSAN MOTOR  
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B60R19/18; (IPC1-7): B60R19/48; B60R19/04;  
B60R19/18  
- **European:**  
**Application number:** JP19990026818 19990204  
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## Abstract of JP2000225907

**PROBLEM TO BE SOLVED:** To ensure a stable shock detection performance by forming a groove extending in the longitudinal direction at a front face of a reinforcement member, an mounting a collision detection sensor in the groove. **SOLUTION:** A groove 2 is formed in the longitudinal direction at a front face of a reinforcement member 1. In the groove 2 a collision detection sensor 3 is mounted so that its front face may be substantially flush with that of the member 1. The sensor 3 has a pair of opposed electrodes 5, 5 at its inner surface. The member 1 is formed by extruding an aluminium alloy. At a rear face 6a of a shock absorbing material 6, a pair of upper and lower grooves 7, 7 are formed to construct a push-in part with respect to the sensor 3. Ahead of the material 6 a bumper facia 9 is arranged. When the material 6 is pressed and crushed by the collision with a substance, the sensor 3 is put on.



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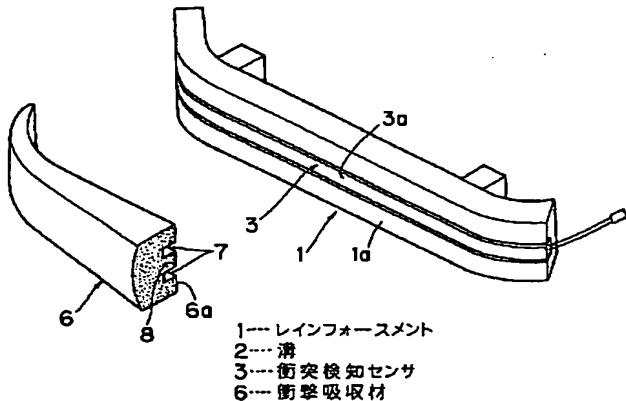
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(54) 【発明の名称】 車両用バンパ

(57) 【要約】

【課題】 衝突検知センサの性能を安定化させる。

【解決手段】 衝撃吸収材6とレインフォースメント1の間に衝突検知センサ3を配設してなる車両用バンパにおいて、レインフォースメント1の前面1aに長手方向に延びる溝2を形成するとともに、該溝2に衝突検知センサ3を収納する。



## 【特許請求の範囲】

【請求項1】 衝撃吸収材とレインフォースメントの間に衝突検知センサを配設してなる車両用バンパにおいて、上記レインフォースメントの前面に長手方向に延びる溝を形成するとともに、該溝に上記衝突検知センサを収納したことを特徴とする車両用バンパ。

【請求項2】 上記衝突検知センサの前面をレインフォースメントの前面と略面一にしたことを特徴とする請求項1に記載の車両用バンパ。

【請求項3】 上記衝撃吸収材の後方に上下一対の溝を形成して上記衝突検知センサに対する押し込み部を構成したことを特徴とする請求項1または請求項2に記載の車両用バンパ。

【請求項4】 上記レインフォースメントを押出成形によって形成したことを特徴とする請求項1～請求項3に記載の車両用バンパ。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は車両用バンパに関する。

## 【0002】

【従来の技術】 自動車のフロントフードに衝撃緩衝機能を持たせたものがある。例えば、特開平4-81369号公報には、フロントバンパに設置した衝突検知センサが衝撃を検知すると、フロントフードの後端を跳ね上げる装置が開示されている。本公報では、衝突検知センサがバンパビームの前面の、緩衝材とバンパフェイシアとの間の隙間に取付けられた様態が開示されている。

## 【0003】

【発明が解決しようとする課題】 衝突検知センサの設置構造としては、衝撃吸収材による衝撃吸収性を、衝突初期から発生させるようにするため、図3に示すように衝撃吸収材aのレインフォースメントbとの合わせ面に溝cを形成し、該溝cに衝突検知センサdを収納したものがある。なお、衝突検知センサdにはチューブeの内面に一対の電極f,fを対向配置したものが用いられている。

【0004】 しかし、このような構造では、バンパフェイシアgが上下方向の荷重を受けて変形すると、衝撃吸収材aにも同様の変形が及ぶため、衝突検知センサdが図5に示すように押し潰されて誤作動する虞れがある。このため、衝突検知センサdの感度を低くする必要が生じる等、衝撃の検知条件を正確に設定することが困難になる場合がある。

【0005】 さらに、衝撃吸収材aは発泡成形によって形成されるため、溝cの深さはばらつきを生じ易い。このため、衝突検知センサdとのクリアランスδが安定せず、衝撃検知度を一定に保ちにくいとう欠点もある。

【0006】 本発明は、このような事情に鑑み、安定した衝撃検知性能が得られる車両用バンパを提供すること

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を目的とする。

## 【0007】

【課題を解決するための手段】 上記課題を解決するための本発明は、衝撃吸収材とレインフォースメントの間に衝突検知センサを配設してなる車両用バンパにおいて、上記レインフォースメントの前面に長手方向に延びる溝を形成するとともに、該溝に上記衝突検知センサを収納したことを特徴とする。

【0008】 上記衝突検知センサの前面をレインフォースメントの前面と略面一にしてもよい。

【0009】 上記衝撃吸収材の後方に上下一対の溝を形成して上記衝突検知センサに対する押し込み部を構成してもよい。

【0010】 上記レインフォースメントは押出成形によって形成してもよい。

## 【0011】

【発明の実施の形態】 以下、本発明の実施例を添付図面を参照しながら詳細に説明する。

【0012】 図1は本発明の車両用バンパを分解して示している。同図において、1はレインフォースメントで、その前面1aには溝2を長手方向に形成してある。該溝2には、衝突検知センサ3がその前面3aをレインフォースメント1の前面1aと略面一になるようにして収納してある。該衝突検知センサ3はチューブ4の内面に一対の電極5,5を対向配置してある。なお、レインフォースメント1はアルミニウム合金の押出成形によって成形されている。

【0013】 6は衝撃吸収材で、その後面6aには上下一対の溝7,7を形成して衝突検知センサ3に対する押し込み部8を構成してある。9は衝撃吸収6の前方に配置したバンパフェイシアである。そして、物体との衝突によって衝撃吸収材6が押し潰されると、その押し込み部8が衝突検知センサ3を押圧変形させてON作動し、フロントフードリフトアップ機構(図示せず)が作動してフロントフードの後端を跳ね上げるようになっている。

【0014】 本実施例の構造によれば、衝突検知センサ3がレインフォースメント1の溝2に収納されているので、衝撃吸収材6が上下動しても、衝突検知センサ3が誤作動する虞れがなくなる。このため、衝突検知センサ3の感度を低くする必要がなくなり、衝撃の検知条件の設定が容易になる。

【0015】 また、衝突検知センサ3の前面はレインフォースメント1の前面1aと略面一にしてあるので、衝撃吸収材6の衝突検知センサ3との対向面(即ち、本実施例では押し込み部8)を溝状に成形する必要がなくなるため、衝突検知センサ3と押し込み部8とのクリアランスが一定に保ち易く、安定した衝撃検知性能を得ることができる。

【0016】 さらに、衝撃吸収材6の後面6aに上下一

対の溝7, 7を形成して押し込み部8を構成してあるので、衝突検知センサ3に対する衝撃荷重の伝達が確実に行われ、衝突検知センサ3の動作が安定する。

【0017】ところで、衝撃吸収材6に押し込み部8が設けられていない場合には、衝突検知センサ3が衝撃吸収材6によって確実に押し込まれるためには、レインフォースメント1の溝2を衝突検知センサ3のそれに較べてかなり幅広く形成する必要が生じるが、本実施例のような押し込み部8を衝撃吸収材6に設けておくと、溝2の幅を広くする必要がなくなり、衝突検知センサ3の取付精度が向上する。

【0018】さらにまた、レインフォースメント1は押出成形によって成形してあるので、溝2を精度良く形成することができ、衝突検知センサ3のがたつきが生じなくなる。

【0019】尚、本実施例の形態では、衝突検知センサ3の検知により跳ね上げ式のフードを作動させる例を挙げたが、衝突検知センサ3で衝突検知されることにより作動するものであれば、様々な形態のフード、または跳ね上げフード以外の（フードエアバッグ等）他の機構にも適用可能である。

#### 【0020】

【発明の効果】本発明によれば、衝突検知センサがレインフォースメントの溝に収納されるので、衝撃吸収材が上下動しても、衝突検知センサが誤作動する虞れはなくなる。このため、衝突検知センサの感度を低くする必要

がなくなり、衝撃の検知条件の設定が容易に行える。

【0021】請求項2のような構成にすると、衝突検知センサ3の前面がレインフォースメント1の前面1aと略面一になるので、衝突検知センサと衝撃吸収材とのクリアランスが一定に保ち易く、安定した衝撃検知性能を得ることができる。

【0022】請求項3のような構成にすると、衝突検知センサに対する衝撃荷重の伝達が確実に行われ、衝突検知センサの動作が安定するとともに、レインフォースメントの溝を幅広くする必要がなくなり、衝突検知センサの取付精度が向上する。

【0023】請求項4のような構成にすると、レインフォースメントに対する溝の成形精度が良くなり、衝突検知センサのがたつきが生じなくなる。

#### 【図面の簡単な説明】

【図1】本発明の車両用バンパを示す分解視図。

【図2】同バンパの縦断面図。

【図3】図2と対応する従来例を示す図。

【図4】図3の点線枠A内の拡大図。

【図5】従来例の問題点を説明する図。

#### 【符号の説明】

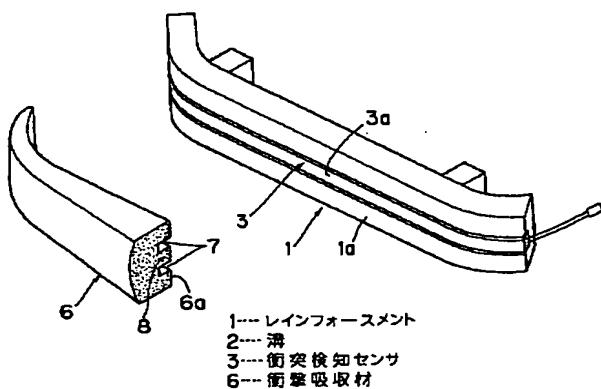
1…レインフォースメント

2…溝

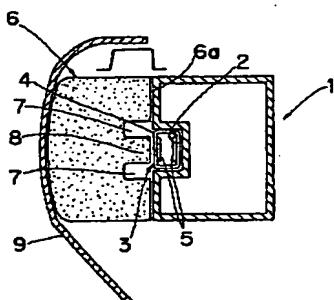
3…衝突検知センサ

6…衝撃吸収材

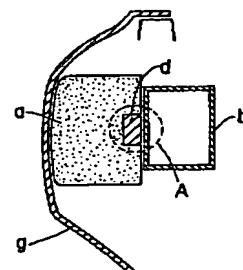
【図1】



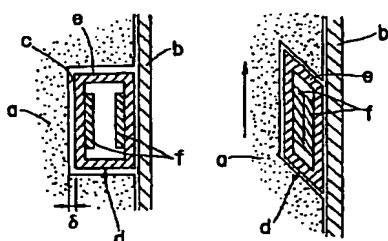
【図2】



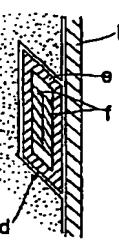
【図3】



【図4】



【図5】



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